side; and therefore we turn the head together with the eye; and hence the muscles of the neck, together with those that turn with the eye to the right, are represented together in the corresponding part of the brain. Deviation of both eyes and of the head to one side is very frequent in lesions of one hemisphere. If it were merely accidental that, when both eyes deviate, the head also deviates to the same side, the calculus of probability would show that no fewer than 20,000 cases would be required to produce that number of deviations of the eye and the head together, which Exner has found in his collection of 168 cases.

As regards speech, Exner remarks that there is no absolute cortical field. The seat of word-deafness must be placed in the second temporal convolution. Amnestic and atactic aphasia is confined chiefly to the second frontal convolution. The centre of speech is situated in the left hemisphere only, that one which is the more cultivated in regard to motion. It is but natural that the movements of articulation should be directed by one hemisphere only. Speech would be considerably disturbed if, for instance, in pronouncing the letter "j" (English "y" in "you") one corner of the mouth should be raised one-tenth of a second later than the other.

Exner then speaks of the cortical fields for the sense of sight, and of those for the tactile sensations, and finally remarks that he considers it of puerile conception, to imagine a single small portion of the body to have no other destination than to serve, as it were, as a handle for the soul in order to innervate a certain group of muscles. It is plain that the conditions at the cerebral cortex are much more complicated, and the corresponding cerebral portion where fibres enter certainly serves for a good many other purposes besides innervation.—*London Med. Record*, Oct. 15, 1881.

A Centre for Colour-Vision.

The physiology of colour-vision has hitherto been studied mainly in reference to the peripheral organ. The functions of the organs of sense have necessarily to be ascertained with exactness before the central relations of those functions can be investigated. The subject of colour-vision is one in which experimental inquiry can give little help, and we have to rely on the slower progress of clinical and pathological investigation. It is rare to meet with clinical evidence at once so clear and conclusive in its physiological significance as that which has been lately published by Samelsohn, of Cologne, on the important subject of the cerebral perception of colours.

The phenomena of congenital colour-blindness suggest that the cerebral centre for colour-vision is distinct from that for the perception of light and visual space impressions, since the perception of colour may be absent when the two latter functions are unimpaired. Unless this explanation is adopted, we are driven to the assumption that the functions of the same centre are so dissociated that the absence of one does not interfere with the perfect development of the others—an hypothesis which presents perhaps the greater difficulties. If a separate centre for colour-vision exists it must be sought, according to the facts already ascertained by experiment, in the occipital lobe. The localization of this centre cannot be effected by experiment, but must be ascertained by pathological investigation, especially by the study of colour-vision, in cases of hemiopia which depend on a lesion, not of the optic tracts, but of one cerebral hemisphere. Are there cases in which such hemiopia is confined to colour-vision? Such cases would, it is evident, afford conclusive proof of the existence of a separate centre for colour-vision.

One such case has been met with by Samelsohn. Uncompleted as it unfortunately is by anatomical proof of the region affected, it is yet of undeniable importance. A man aged sixty-three complained of affection of sight, which followed an apoplectic seizure. Right-sided hemiplegia was present at first, but nine months afterwards had lessened to a trifling weakness in the arm and leg, without loss of sensibility. Examination of the eyes showed that the ophthalmoscopic appearances were normal, and the acuity of vision unimpaired, excepting trifling presbyopia; slight weakness of the right superior rectus existed, with corresponding diplopia above the horizontal plane. Since he complained of imperfect sight, even when the right eye was closed, the fields of vision were examined. On testing with a white object no defect could be discovered, even with a test object of very small size. When, however, coloured tests were substituted, there was found to be a typical left-sided hemiopia for all colours; the loss began exactly at the vertical middle line. In the right half of each field every colour was seen, even in the smallest area, well up to the periphery; in the left half no colour could be recognized, even in a large area, each appearing to be a dull gray. The same result was obtained on testing in the dark with lights tinted by passing through coloured glasses. Under treatment the paralysis of the superior rectus passed away; the paresis of the limbs and the affection of sight remained exactly the same. Four years later the patient died, after a fresh attack of apoplexy, but unfortunately no post-mortem examination could be secured.

Although no case equally clear has hitherto been recorded, facts pointing in the same direction have been observed by Treitel. The clinical evidence must thus be considered conclusive that there exists in the cerebral hemisphere a centre for colour-vision so independent of that for white light that it is capable of separate damage from acute lesion.—*Lancet*, Nov. 26, 1881.

Transplantation of the Medulla of Bone.

Prof. Bruns, of Tubingen, reports in the *Archiv für Klin. Chir.*, Band xxvi. Heft 3, the results of some experiments he has lately made on animals, with the object of determining whether portions of transplanted bone-marrow can give rise to the formation of deposits of true osseous structure. An osteogenetic function of marrow, though indicated by the existence of an internal as well as of an external mass of callus after fracture, has been denied by many pathologists, and especially by Lebert, who held that the internal callus is only a displaced portion of the callus formed by the periosteum. It has been held also by Maas and many others, that the marrow and medullary membrane can only absorb and never form bone. The only cases in which any bone-producing action on the part of marrow can be proved in the human subject, are pathological instances of intramedullary deposition of bone without fracture, and without any coexistent formations of bone externally. Werner, by administering phosphorus with food, succeeded, even in full-grown animals, in bringing about almost complete ossification of the medullary cavity of long bones; and similar results have been attained by Busch through injections of mercury in small quantity into the arteria nutritia. That this internal formation of new osseous tissue in a long bone may be due to the action of specific stimuli, as well as to that of irritating agents introduced from without, may be proved by specimens of so-called osteosclerosis, in which disease the whole of the medullary cavity is often occupied by a very hard ivory-like substance. In order to decide whether or not this proved osteogenetic action of marrow be of a strictly pathological character, and analogous to the rarely observed ossification of muscular and testicular structures, Dr. Bruns instituted an extensive series of experiments. It was proposed to settle this